THE SELECTION AND CONSUMPTION OF FOOD BY NURSERY SCHOOL CHILDREN

by

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The purposes of the study were to determine: which foods from a selected group of foods twenty-four preschool children would select to eat and the apparent amount of each food that was consumed; the relationship between the food the children selected to eat and the amount they consumed; and the relationship between breakfast in the home and the foods consumed at lunch in the nursery school.

The subjects of the study were the twenty-four three and four year old children enrolled in the Nursery School at the University of North Carolina during the 1964-65 school year.

For twenty days the children entered the dining room in random order and selected their noon meal from the foods that had been arranged by random order in groups of meat and meat substitutes, vegetables, finger foods and dessert.

The food was measured and served in a standard tablespoon. A pre-measured sample of each food had been weighed to the nearest tenth of a gram and the foods selected and consumed were converted to gram weights. Each child was served one-half cup of milk. The child could ask for additional servings of each food including milk. A teacher sat at each table with the children but did not eat. No pressures were put upon the children to eat nor were comments made concerning the amount or kind of food that was eaten. As nearly as possible all outside influences were controlled so that complete objectivity was maintained.

A record was made of the number of selections and grams selected and consumed by the children during the investigation. The plate waste was weighed to calculate the food consumption of the children. The total, mean, and range was calculated for the foods selected and consumed by the children. Correlation coefficients were computed to determine the relationship between the food selected by the children and the amount consumed.

The mothers filled in for each day a check sheet indicating that day's breakfast pattern of the child. These sheets were scored and the group average was obtained. Correlation coefficients were computed to determine the relationship between the group scores on the breakfast check sheet and the amount of food consumed at lunch.

Results of the study indicated that desserts were the preferred foods both by number of selections and percentage consumed. Meat and meat substitutes were second to desserts as preferred foods. Findings in the vegetable and finger food group revealed that although a wide range of selection and consumption was recorded within the groups neither was high.

The study revealed no relationship between the breakfast pattern of the children and the food consumed at noon in the nursery school.

The investigator concluded that the group apparently had established definite food preferences, indicating the early development of choosing ability. Although a wide range of selection and consumption among the foods the children were not adventurous in their selections and apparently were not influenced by color or texture. Some of the children whose usual attitude toward tasting food

was poor select and eat larger amounts and appeared happier during the noon meal.

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CHAPTER I

THE PROBLEM

The importance of nutrition and good food habits at various stages of the life span has been well documented by numerous nutritional studies. Growth of all species, the structure of the bones and teeth, ability to withstand infection, physical stamina and even the longevity of life is dependent to a large degree upon the nutritional habits of the individual. A baby comes into the world without established patterns of behavior. He is learning to live in his world. He is experiencing mental and emotional growth. He is forming patterns of eating and attitude toward food that develop into lifetime practices. Studies of food patterns indicate that with each advancing year the possibility for dietary deficiencies is greater. Although the occurrence of such obvious nutritional deficiencies as rickets and beri-beri in children have become rare many more subtle symptoms which might result from nutritional inadequacies such as extreme fatigue, circles under the eyes and scaliness of the skin on the arms and legs of children is not uncommon.

Nursery school teachers and parents recognize the importance of the diet in the preschool years and often express concerns about the food habits of children especially as they relate to health. Langford (1960, p. 206) states, "The problem of getting children to eat the proper foods and in sufficient quantities is evident whenever groups of parents get together." There is an

abundance of literature available offering excellent guides on what to eat for good nutrition. This has become basic knowledge. Another type of learning is involved, however, in knowing how to influence others, particularly children, to establish the kind of eating practices that will benefit them all their lives. Martin (1954, p. 3) suggests that, "The goal therefore becomes not good nutrition as such but happy, satisfied adjusted children providing the favorable conditions which foster the development of good habits and from which satisfactory nutritional status is a natural outcome."

The noon meal at the nursery school can offer the child new experiences with foods and an opportunity to develop a positive attitude toward food in a friendly and accepting atmosphere. The social aspect enters into the noon day meal at the nursery school for companionship begins early as the nursery school child is included in the table conversation. This companionship assists the child in learning to be an acceptable member of a group at meals.

Purpose of the Study

A review of current literature and research revealed a lack of information on the food selections of preschool children. The Clara Davis studies (1928, 1933) are the only ones known to this writer in which the food choices of very young children were investigated. This lack of readily available information, the importance of the problem of establishing good eating habits in early childhood and the investigators experience with the concerns of teachers and parents relative to the food habits of the nursery school children

prompted the present study.

The primary purposes of the study were:

To determine which foods from a selected group of foods would twenty-four preschool children select to eat.

To determine the apparent consumption of the foods selected by the twenty-four preschool children.

To determine if a relationship existed between the food the children selected to eat and the amount they consumed.

To determine if a relationship existed between breakfast in the home and the foods consumed at lunch in the nursery school.

It was the belief of the investigator that a study of the food selections and consumption by a group of preschool children might well provide information for group discussion at parent conferences and in teacher training programs.

Limitations of the Study

The investigator was aware that certain limitations existed before conducting the study. The size of the group was one of them. The study was limited to twenty-four three and four year old children who were currently enrolled in the University of North Carolina at Greensboro Nursery School during the 1964-65 school year. The foods offered for selection were foods which had been served previously in the nursery school, therefore all of the foods were familiar to the children. Preliminary observations of behavioral patterns

indicated that three and four year old preschool children have already established some bias and food prejudices. The children enrolled in the nursery school were from the upper middle socio-economic group and they may have had better diets at home than children from financially deprived families.

Another limitation was the inability to set controls at home. It is the philosophy of the nursery school to inform parents of research being conducted in the nursery school. Therefore, while no attention was directed to the children's choice of food at school it could not be determine if such was the case in the home.

Organization of the Remainder of the Thesis

The remaining chapters include a review of the literature related to children's food selections and the consumption of food by nursery school children. Chapter III deals with the procedure followed in this investigation. Included within this chapter are a description of the subjects and the cooperative aspects of the study. The selection of the foods served, methods of measurement and recording information are also discussed in this chapter. Chapter IV includes the collected data and a discussion of the results. The fifth and final chapter summarizes the study and presents the conclusions.

CHAPTER II

REVIEW OF THE LITERATURE

An abundance of literature is available relative to the nutritional requirements of preschool children and the importance of developing good food habits in young children as related to growth and development. However, there has been little research conducted on the self-selection of diets by preschool children or the amounts of individual foods consumed by them. A brief, over-all view of planning well balanced meals in the nursery school will be cited along with those studies directly related to food selection and food consumption by preschool children.

Planning Well Balanced Meals in the Nursery School

Indications are that the trend in the nutritional status of children in this country has gradually improved in the last quarter of the century. Such nutritional deficiency diseases as scurvy and rickets have been virtually eliminated. Today children in America are on the average taller and heavier than those of corresponding ages in previous generations. The factor regarded as the most important in bringing about this change is improved nutrition. However, studies of food patterns of school children indicate that as children grow older more dietary deficiencies appear. (Martin, 1954, Morgan, 1959).

In order to understand the eating habits of normal three and four year old children the following descriptions are presented by Ilg. (1948) She

describes three years as the first age when green vegetables are more acceptable, especially raw vegetables--raw carrots and raw beans. The three year old likes to chew and often prefers raw foods to those that have been cooked. The child's appetite is fairly good and desserts and sweets are more desirable. A three year old also may ask for special foods he likes as the meal is being prepared. He can feed himself but may want to be fed or may dawdle. Ilg suggests that breakfast and supper may be the best meals for the three year old.

Ilg concluded that four year olds have become quite sociable and some eat better at the table with the family than alone. The four year old, however may experience difficulty in letting his talking interfere with his eating. The four year old child's appetite is fair, and he has definite preference for certain foods and definite dislikes for others. Children are easily influenced by the food habits of others and may go on food "jags" or food strikes. (Davis, 1933, Ilg, 1948, Langford, 1960)

The preschool period is suggested by Morgan (1962) as perhaps the most important time for the development of good food habits. The preschool child is still cutting teeth and may reject food that is hard to eat and foods that are stringy. A child may need to have new foods frequently placed before him many times before he will come to accept them. Children will usually come to accept a wide variety of foods if the food is enjoyed by the family and if no great stress is placed upon any one specific food or upon any large quantity of food consumed, and if the foods are made available routinely.

Both Morgan (1962) and Peckos (1960) agree that the late preschool

years are a period when the rate of physical growth is decreasing, consequently the child's mother may show undue concern when the child no longer needs or wants as much food because she may have come to think of the child's consumption of large quantities of food to be of extreme importance. Since the preschool child's appetite varies considerably from meal to meal and perhaps the most effective way of establishing good food habits in preschool children is to expect the child to eat the food set before him and for the parents to set an example by having good food habits themselves.

The eating, sleeping and elimination habits in a group of forty-eight preschool children cared for at home by mothers were studied by Glass (1949) who reported that eating disturbances formed the great majority of the problems observed and that many mothers seemed more anxious about poor appetite and food finickiness than other habit difficulties. Even with allowances made for a mother's over anxiety and too high standard of a child's appetite, poor appetite and food fads seemed very common among these preschool children. Of the ninety-six children studied by Glass, forty-three showed some form of eating difficulty. Glass observed that the more impersonally the food was presented, the less likely the child was to use rejection or acceptance of food as a method of gaining attention. Results indicated that most eating difficulties occurred in children in the three and four year old groups. Since many young children cannot go for four or five hours without food, therefore, adults can help children by setting meal times when children are really hungry. Breakfast is commonly the day's poorest meal and studies tend to reveal that

children who do not eat breakfast do poorer in school, perform physical tasks poorer and may be more irritable and emotionally unstable. (Lowenberg, 1959) Lowenberg suggests that an adequate breakfast should contain a high protein food, at least one food to supply energy, milk and a serving of fruit or fruit juice. An adequate lunch for a young child should include a high protein food, a food rich in vitamins and minerals and a food for energy. A dining area suited to the tempo and the needs of the children should be available, and there should be time for the child to eat without hurrying. Servings of food should be small.

Several excellent guides for planning and preparing well balanced meals in the nursery school are available. One such guide has been prepared by Sweeny and Breckenridge (1951). The authors suggest planning meals in the nursery school with the entire day's food needs in mind. Some knowledge of the food served at home, therefore, is required if the child is to be well fed. Factors brought out as important to remember in feeding preschool children were:

> Children are learning to like new foods. They like natural food flavors best and simple foods better than mixtures.
>
> Mealtime should be a happy interesting occasion for the child. Companionable, good-natured adults, who have good food habits themselves, will have a great influence on how well the child takes his food and the amount he eats.
>
> Children react to variety in the texture and to the consistency of food. Some contrast of color, flavor and texture as well as careful preparation and attractive service are highly desirable.
>
> It is necessary to serve food that encourages a child to chew properly and to exercise his teeth and gums. Certain raw vegetables, raw fruits, bread crusts and toast are food for this purpose.

> A small portion, with the opportunity for the child to help himself from a bowl to more of the food generally creates a much greater desire for that food. Small servings also help the child to form the habit of finishing what is on his plate. (Sweeny and Breckenridge 1951, p. 16)

The amount of food the preschool child will eat varies. Generally speaking, a larger child will eat more food than a smaller one; a more active child will eat more than the less active one. However, the amount of food any child eats and his preference for food may vary from day to day.

Average amount of some foods generally eaten by children who have attended the Merrill-Palmer School were cited by Sweeny and Breckenridge (1951, p. 19).

Food	3 years	4 years
Milk	1 Cup	1 Cup
Bread	1/2 Slice	1 Slice
Meat Pattie	1/4 Cup	1/4 Cup
Meat Roast	1 1/2 Tablespoons	2 Tablespoons
Vegetables		
Cooked	1/4 - 1/3 Cup	1/3 - 1/2 Cup
Uncooked	4 Strips	6 Strips
Fruit	1/3 Cup	1/2 Cup

Foods should be simply prepared for ease in eating and digesting by the preschool child. Meats should be cooked until tender and well-done, then cut into small bite size pieces. Raw fruits and vegetables should be served in pieces small enough for the child to pick up with his fingers. Vegetables should be cooked in a very small amount of salted water to preserve their nutritional value, flavor and color. Fruits are desirable as desserts for they combine high food value with digestibility.

Another guide for feeding groups of children has been prepared by the Children's Bureau (1960). Suggestions were given for meal planning, food purchasing, food storage and methods of standardizing food preparation. The following specific suggestions were cited as means for improving the eating habits of preschool children.

> Food "jags" are usually temporary if there is no emphasis placed on them.
>
> Requiring that a specified food or amount of food be eaten may cause problems.
>
> Serve food in a form that is easy for young children to manage.
>
> Don't expect little children to eat as skillfully as adults.
>
> Seating children in small groups of four to six with an adult makes mealtime more of a family-type social occasion.
>
> Introduce children to new foods. Give them the opportunity to eat a variety of foods.
>
> Make mealtime a relaxed and friendly occasion. Provide a quiet time just before their meals. (Children Bureau, 1960, p. 34)

Food Selection Studies

Children's attitudes toward food were investigated by Dudley, Moore, and Sunderlin (1960) at the Iowa State University Nursery School. Subjects in the investigation were fifty-three nursery school children, ages thirty-two to sixty-four months. The term was divided into three periods, fall, winter and spring and for sixteen days during each period each of four vegetables was served four different times at the regular noon meal. Each day one vegetable prepared in four different ways was offered to the children. Green vegetables

chosen as representative were green beans and asparagus. These were prepared as au gratin, creamed, buttered whole and buttered pieces. Representative of yellow vegetables included fresh carrots and rutabagas which were prepared as raw sticks, buttered grated and buttered julienne, and creamed. Approximately one tablespoon in volume was the usual serving size of vegetables in the nursery school. Record was made of preparations chosen by each child for the first and additional servings. Plate waste for each child was weighed, and the amount recorded.

Findings which were of interest to the present study revealed that the children preferred the raw preparation of carrots and rutabagas to any other group. Au gratin asparagus, buttered cut green beans and creamed vegetables received either the lowest or next to the lowest preference score of all preparations. Dudley, Moore and Sunderlin's data revealed much variation among individual children in the choices made. Some children showed definite preferences, selecting either two or three preparations every time they were offered.

A study by Vance (1932) investigated to what extent there might be preference for some food over others in the noon day meal in the Iowa State nursery school. Records of the order in which children tasted the foods on their plate as well as the order in which they finished them were made for forty-four different children. Records and observations averaged twenty-five times for each child. When the foods were arranged in order of average rank for finishing the data revealed that meats, apples, sandwiches, and eggs were finished early and vegetables were eaten last. Raw vegetables were preferred

over buttered or creamed vegetables. Vance believed that taste preference was the largest single factor affecting the order in which the children finished their foods.

A comparison of the food intake at lunch under two styles of service designated as standard and self-service was made by Justice, Mattson and Schunk (1946) with twenty-six children enrolled in the Purdue Nursery School.

For the standard service the food was weighed as it was served on the child's plate. After the meal plate wastes were weighed and subtracted from the weights of the food served. Self-service included having the individual child put food, including milk, on a plate and the investigator weigh it. Foods were those on the regular nursery school menu, and the children were instructed to take as much as they thought they could eat. Additional servings were available. Plate waste was measured and recorded. The investigators found that with self-service the children ate more protein-rich foods, raw foods, potatoes and rice. The ratio was about two to one in favor of these foods. Approximately three-fourths of the children consumed larger quantities of desserts when allowed to serve themselves. Milk consumption was definitely lower under self-service.

An experimental study on the effect of choice on the amount of vegetables eaten by preschool children was conducted by Maria Moyorga (1963). Her subjects were twenty-seven nursery school children whose ages ranged from two to four years. These children were paired into two groups, according to age and to the amount of vegetables eaten during the trial period. The

experimental group always had a choice of two cooked vegetables, which the control group was served one vegetable with the regular meal. She found that the subjects in the experimental group consumed more vegetables than did those in the control group but the difference in consumption was not statistically significant. Moyorga did find significant differences in consumption, however, when the eating performance of the experimental subjects under controlled conditions was compared with their performance during the testing period. Since the variables of sex and age were considered when the two groups were matched Moyorga concluded that choice was the only operating factor in the increased amount of vegetables consumed by the experimental subjects during the study. She further suggested that a choice of cooked vegetables offered to preschool children at meals might be used as a means of improving their eating performance with respect to cooked vegetables.

Three infants of weaning age were the subjects of a self-selected diet experiment, two for periods of six months each and one for a period of a year, conducted by Clara Davis (1928). The purpose of the study was to assemble data on the food consumed and the condition of the infants when they were allowed to choose their own food in such quantities as they desired from a wide range of commonly used natural food materials simply prepared with little or no seasoning. Combinations of food materials such as custards, or soup were not used, insuring that each food when eaten was chosen for itself alone. From the results obtained with these three infants, Davis concluded that weanlings were able to select their own foods from a list of simple natural ones and would

consume in quantities sufficient amounts to maintain themselves with apparently excellent digestive and good nutritional results. The infants selected both animal and vegetable substances. In eating they were governed not only by calorie needs but showed definite preferences, which were unpredictable and changed from time to time.

A report presented to the Chicago Pediatric Society in 1932 by Clara Davis (1933) contained information pertinent to the present study. She presented results of a year's experiment in self-selection of diet by children in the Orthopedic Ward of the Children's Memorial Hospital in Chicago. Davis concluded that the advantages of the self-selection method of feeding were:

1. A greater variety in diet could be afforded without increase in cost.

2. The method allowed for individual choice in food.

3. The children displayed better appetites and more enjoyment of food.

4. The total mealtime was shortened by fifteen to thirty minutes and lessened nursing time and labor spent in serving meals.

5. The amount of food waste was consistently less for the orthopedic ward than for any other ward in the hospital.

6. The most noticeable results from the standpoint of dietetics was the lowering of the proportion of sweet and starchy foods and the corresponding increase in the fruits, vegetables and meats.

Davis concluded that the "joys of food bulk large in childhood, and if we can add to the gusto with which the child eats, allow him some liberty of choice and at the same time have him thrive to a greater degree it would seem to be worthwhile." (p. 750)

The Nursery School of the Institute of Child Welfare, at the University of Minnesota, was used by Prevey (1936) to study what effect self-service without adult interference would have on the kinds and amounts of food eaten by nursery school children. The prevailing custom of food service was from a serving table, and the children were required to take a bite of disliked food. During the experiment food for the entire meal was arranged on a side table. The child served himself without comment from adults present. Selections included two cooked vegetables, two raw vegetables, and potatoes, meat or meat substitute, whole wheat sandwiches, milk, and two deserts. A total of fifty-four meals were served. A daily record of the food selection of each child was made. Results of this investigation revealed that no child at any meal ate one type of food to the exclusion of all others. Self-service appeared to be a means of increasing the consumption of cooked and raw vegetables, meat, sandwiches and dessert. The consumption of milk was less than with regular service. Prevey concluded that self-service with little adult interferences was a satisfactory method of serving nursery school children. Furthermore, if essential foodstuffs were offered, children would probably secure an adequate diet over a period of time. She suggested that with the lessening of adult pressure, food problems would decrease with this type of service.

Food Consumption Studies

A comparison of the mean values of food consumed by a group of three and four year old nursery school children with the Nutrition Research Council

Recommended Dietary Allowances was made by Greschunk (1963). Standard measuring cups and spoons were used, and all food consumed was determined in terms of grams, weighed to the nearest gram.

Plate waste for each group of children was scraped into weighed beakers and the weight of the food was determined by the difference. Results showed that vegetables and raw vegetables were consumed in the smallest amounts by both groups of children. The mean consumption of vegetables tended to cluster in groups but without definite order. Corn, stewed tomatoes, and frozen spinach were consumed in the greatest quantity. Potatoes were treated as a separate group, and mashed potatoes were preferred. In contrast, desserts were consumed in the largest amounts and applesauce was eaten in the largest amount. Additional findings indicated when the menu was examined in its entirety the consumption of preferred foods greatly exceeded the less preferred ones. A definite increase in food consumption occurred as the children became accustomed to the dining room service and the pattern of the meal. Greschunk concluded that consumption was markedly affected by careful selection and combinations of food items.

Food consumption and preferences of the nursery school child were investigated by Lamb and Ling (1946) at the Nursery School of Texas Technological College. Results of their investigation showed that the children consumed comparatively small amounts of food. Consumption of milk, potatoes, and vegetables in no case met the recommended levels. Green and yellow vegetables were found to be lacking most in the diets of the children. In contrast, the

consumption of all kinds of meat, citrus fruits and sugar products was adequate. General conclusions reached which were of interest to the present study are as follows:

> By comparing the food consumption records gathered in this study with established standards it has been found that although the nutrient intake of a child may be generally adequate, his consumption of certain food groups can still fall short of the recommended amounts.
>
> Preschool children of this locality have a tendency to like green and yellow vegetables least of all major food divisions and this lack of interest increases with age.
>
> The preschool child has learned to like a wide variety of foods by the time he reaches the nursery school age and regards eating as a pleasurable occasion.
>
> Frequently inadequacy in the amounts and kinds of food consumed can be traced to faulty meal planning on the part of the responsible adult rather than to a lack of positive liking of the child for these foods.

The food intake of twenty-one preschool children enrolled in the University of Georgia Nursery School was investigated by Mirone, Torrance, and Roughton (1956). The study was conducted for fifteen days over a period of five weeks. Results showed that with the exception of Irish and sweet potatoes, vegetables were consumed in the least amounts. The average amount of vegetables consumed ranged from 1.9 to 11.3 grams. The average consumption of Irish potatoes amounted to 18.2 grams. Results of the investigation indicated that fruits were liked better than vegetables. Consumption of fruits such as applesauce, pineapple, peach salad, and pear salad ranged from 23.1 to 44.3 grams with an average of 32.6 grams. The average consumption of meat ranged from 6.6 to 18.0 grams. Beef was eaten in the largest amount, and liver was the

least liked of the meats served. Milk was the only beverage served and the average milk consumption was 95.2 grams. This milk consumption was below the recommended levels.

CHAPTER III

PROCEDURE

The purpose of this study was to determine what foods preschool children enrolled in the University of North Carolina at Greensboro Nursery School during the 1964-65 school year would choose to eat and how much of these choices they would consume. The choices were made from a wide range of selected foods. It was also purposed to study the relationship of the foods selected to the apparent food consumption. It was also purposed to determine the relationship between the breakfast at home and the food consumed by the children at the noon meal in the nursery school.

Selection of the Subjects

Facilities of the nursery school at the University of North Carolina at Greensboro, North Carolina were utilized in this study. This school is a laboratory for courses in child development and is used by students in other departments. The nursery school is located on the campus and is a part of the School of Home Economics. Two large classrooms are located within the building. Before the noon meal tables in one room are arranged as a dining room area. Each child has an assigned place to eat lunch.

The subjects for this study were the twenty-four three and four year old children enrolled in a regular school session at the nursery school. The children enrolled can be classified in the upper middle and upper socio-economic

group. Professions of the fathers included three doctors, two professors, one architect, two proprietors, four attorneys, one realtor, one owner of a meat packing company, one farmer, one accountant, one executive vice president, one credit manager, one chemist, one sales representative, and one trucking supervisor. Only one mother, a college professor, was employed and one mother, a lawyer, was engaged in private practice.

Cooperative Aspects of the Study

During a conference with parents the nursery school director discussed the school's primary function of providing a laboratory for research and for training college students. They were informed that cooperation was expected from them in the total nursery school program. Under the circumstances, it was not unusual that parent cooperation was one hundred per cent.

The parents cooperating with this study were the mothers of the twenty-four children enrolled in the nursery school. Every mother attended a conference for the purpose of informing them of the study and soliciting their cooperation. The director and investigator distributed twenty breakfast check sheets to each mother. They were instructed to check the information requested each day and to return the scheet to the investigator when the child came to school. During the twenty day period of the study the mothers were requested to refrain from discussing the nursery school noon meal with their child or with other children riding in their car pool.

Eleven mothers assisted with serving the noon meal during the study.

They were trained and supervised at all times by the thesis director and investigator.

Pretest

A pretest was conducted for two days in order to determine the best procedure to use for serving the food to the children, and for recording their selections and plate waste. The pretest also provided an opportunity for making any necessary changes in the study plans. The results of the pretest was discussed at a nursery school staff conference and any appropriate suggestions were incorporated into a combined form for recording food selections and plate waste.

The pretest also gave the children time to adjust to a change in routine. The regular procedure for serving meals had been placing the food on the child's plate and setting the plates on the tables before the children came into the dining room. A teacher or graduate student sat at the tables with the children and ate lunch with them. During the twenty day experimental period, the food was served cafeteria style and the teacher or graduate student sat at the tables with the children but did not eat with them. The children entered eagerly into the cafeteria style of eating and adapted readily to changes in the routine which were necessary for the design of the study. A stop watch was used to determine the time required to serve the twenty-four children. The second day of the pretest the serving was accomplished in twelve minutes. Twelve minutes was the average serving time throughout the study.

Procedure Used in the Study

For a period of twenty consecutive school days the noon meal at the nursery school was served cafeteria style in the dining room. The children sat at the five tables with the same teacher or graduate student seated at each table with the same children every day. Two additional tables were set up in the dining room and the food was arranged on these tables and served from them.

The teacher or graduate student did not eat with the children but recorded the foods selected by those eating at her table. Attempts were made to keep the children from being influenced by the adults seated at the tables with them. The teachers and graduate students were instructed not to mention the words "food" or "eat". They were told to neither encourage nor discourage the children to eat and were further instructed to make no comment about the child's food selections nor consumption. The only guidance given the children by the teachers were in the form of specific directions, such as: "This is not play time," or "You may ask for more of anything you want to eat." The children ate at their regular places in the dining room which were identified by a tinker toy name card placed in front of the silverware. When the child had finished eating and before leaving the table, he placed his name card in his plate and left the glass and plate on the table. This was a change in the regular routine of taking their plates to a counter in the back of the dining room near the kitchen. By following this procedure confusion was kept at a minimum, and plate waste was more easily weighed and recorded.

The children entered the dining room each day in random order. The standard procedure for randomizing the children was the same every day. Twenty-four cards were removed from a deck of bridge cards and a child's name was written on each card. The twenty-four cards were shuffled and cut five times and then turned over one at a time. As the child's name appeared he was given a number in order of 1 - 24. Every day each child was given a card with a number on it before entering the dining room. The numbers signified the order in which he would enter the dining room.

At the end of rest period prior to lunch on the first day of the study the children were told to take their rest pads to their lockers and return to the three year old room to learn how to play a new game. They were told that they were going to pretend to eat in a cafeteria for several days and that the numbers assigned to them would be their lunch tickets. As the children's names were called from the randomized list they entered the dining room in groups of five. They were instructed that they must proceed in the cafeteria line according to the number given them. A graduate student assisted the children in following this procedure every day. The investigator was in the dining room beside the serving table and the children gave her their numbered ticket thus providing a second check to be sure of the order in which the children were served.

Four adults trained and supervised by the investigator served the food to the children each day. Objectivity and consistency were primary concerns with the instructions given that the adults who served were not to ask the children what they wanted to eat but were to serve only the foods selected by

the children.

The foods were placed in random order on the serving tables in groups of meat and meat substitutes, vegetables, finger food, dessert and bread. The same procedure used for randomizing the order in which the children entered the dining room was followed to randomize the order in which the food was placed on the serving table. Four cards were selected from a deck of cards. Each of the food groups was written on one of the cards and these were shuffled and cut five times. The only exception was milk, which was already on the table when the children entered the dining room and each child was served one half cup every day. The variety in the list of foods was made from menus used earlier in the year and no new food was introduced during the study. The list was composed of a wide range of foods of both animal and vegetable origin. Combinations of food materials such as puddings and meat loaf were not used. The food simply prepared, was cooked in a minimum amount of water. Small amounts of salt and margarine were added for seasoning. All meats and meat substitutes, vegetables, and fruit were cut into small bite size pieces: finger foods were cut in small strips or wedges. Raw and cooked carrots and apples were offered for the child's selection. The full time experienced cook on the nursery school staff with the assistance of a college student prepared the food following the directions given by the investigator.

The children selected their lunch from the twenty-four foods listed in the four categories in Table 1. They indicated their selection of food to the adult who was serving. The children selected and ate according to their moods

Table 1

Selected Choices of Foods

Meat and Meat Substitutes	Vegetables	Finger Food	Dessert
Roast Beef	Broccoli	Carrot Sticks	Sliced Peaches
Roast Chicken	Green Beans	Celery Sticks	Pineapple Chunks
Broiled Flounder	Green Peas	Lettuce	Applesauce
Beef Pattie	Buttered Carrots	Tomato Wedge	Jello
Cheese	Buttered Potatoes	Raw Cauliflower	Pear
Boiled Egg	Beets	Apple Wedge	Raisins
Accompaniment			
Bread			

and desires and returned for as many additional servings of food as they wanted.

Foods were measured and served in portions of one level tablespoonful to provide a standard measure and to expedite serving procedures. The size of the portions chosen was based on the group's eating habits and were smaller than those suggested by Sweeny and Breckenridge (1951). Additional servings were always available and it was the belief of the investigator that small servings would lessen the tendency to discourage the child with the very small appetite.

For this study the following portions were used:

Meat and Meat Substitutes

Meat---------- one tablespoonful
Cheese---------- one-half slice
Boiled Egg---------- one-half slice

Cooked Vegetables---------- one tablespoonful

Finger Food

Carrot sticks)
Celery sticks) three thin strips, three inches in length

Lettuce)
Raw Cauliflower) one small piece

Tomato)
Apple) one wedge, one-sixth of one tomato or apple

Desserts

Peaches)
Pear chips)
Applesauce) one tablespoonful
Raisins)

Jello----------three tablespoonfuls

Pineapple----------three small chunks

Data Collection

For a period of twenty days the noon meal in the nursery school was served cafeteria style with the children entering the dining room in random order and selecting their food from a group of twenty-five selected foods. The child carried his plate of food to the table and ate at his regular place with a teacher or graduate student who recorded each child's food selections for each day on a check sheet provided by the investigator. A premeasured sample of each food was weighed every day to the nearest tenth of a gram and the gram weights recorded. The number of selections of each food was converted to the number of grams selected of each food and recorded using the preweighed sample of each food as a basis for conversion.

The food consumed by the children was determined in gram weights, weighed to the nearest tenth of a gram on an Ohaus scale. The method used for determining the child's daily food consumption was to measure and weigh plate waste for each day for each child. The child's plate waste was subtracted from the food served to that child thus giving the apparent consumption of each of the twenty-five foods and milk for each child for each day. The total number of grams consumed of each of the foods for each day by the group of children was determined by adding the grams consumed of each food by each child.

The breakfast check sheets were scored every day and the scores were

recorded for each child according to the variables as shown in the Appendix on page 55.

Data Analysis

The noon meal in the University Nursery School was served cafeteria style for a period of twenty days to a group of twenty-four three and four year old children, which were enrolled in the nursery school during the period of the study. A record was made each day of the number of servings selected and the grams selected and consumed of each food by each child and for the group of children. An average was obtained for each day for each child and an average for each day for the group of children of the number of foods selected and the grams selected and consumed. The total selection, the mean selection, and the range of selection for each of the foods were determined for the group of children for the twenty days. The percentage of each food eaten during the twenty day period was calculated.

The breakfast check sheets were scored and recorded for each day for every child and for the group of children. An average score for each of the breakfast variables was obtained for each child and for the group of children for the twenty day period.

In order to summarize the data, each food was classified into one of four food groups: meat and meat substitutes, vegetables, finger food and dessert. Milk and bread were treated as separate foods. The average grams selected and consumed of each of the foods already determined for the group

of children was recorded in the appropriate category. These averages were added and the mean grams selected and consumed for each of the food groups was determined for the group of children during the twenty day period.

The relation between the mean scores for the various breakfast variables for the group of children was correlated with the mean amount in grams of each food group consumed by the children by computing Pearson Product Moment Correlation was also computed to determine the relationship between the mean grams of each of the food groups selected by the children and the mean grams consumed.

CHAPTER IV

RESULTS

Of primary interest to the study were the foods that the twenty-four nursery school children selected to eat. The selections of each food for the group of children was obtained each day. The daily selections of each food were totaled and the mean selections and the range of selection of each food by the group of children during the twenty days was obtained. A summary of these selections is found in Table 2. Foods classified as desserts were selected most frequently by the children with jello being selected the greatest number of times. Jello was selected a total of 520 times during the twenty days with a mean of 26.0 selections and a range of 15 - 39 selections. Pear chips were the least frequently selected dessert. The selections of the other desserts were between jello and pear chips as indicated in Table 2. Milk was not offered as a selection but rather was served to each child every day. Additional servings of milk were available if the child wanted them. Of the foods offered as selections cheese was the second most frequently selected food being selected 336 times with a mean selection of 16.8 and a range of 12 - 26 selections. The entire meat and meat substitute group of foods appeared to be popular with the children. Broiled flounder was the least frequently selected in this food group.

Vegetable selections tended to fall into two definite groups. Green beans, green peas and buttered potatoes were frequently selected and buttered

Table 2

Frequency of Food Selected by Twenty Four Nursery School Children at the Noon Meal During a Period of Twenty Days as Shown by the Total Number of Selections of Each Food

Food	Total	Mean	Range
Meat or Meat Substitute			
Roast Beef	180	9.0	4 - 16
Roast Chicken	207	10.4	2 - 16
Broiled Flounder	163	8.3	3 - 13
Beef Pattie	255	12.8	8 - 18
Cheese	336	16.8	12 - 26
Boiled Egg	231	11.6	6 - 16
Vegetables			
Broccoli	36	1.8	0 - 5
Green Beans	125	6.3	3 - 10
Green Peas	158	7.9	2 - 13
Buttered Carrots	55	2.8	1 - 9
Diced & Buttered Potato	123	6.2	2 - 11
Buttered Beets	40	2.0	0 - 6
Finger Foods			
Carrot Sticks	166	8.3	3 - 17
Celery Sticks	88	4.4	1 - 9
Lettuce	58	2.9	0 - 5
Tomato Wedge	85	4.3	1 - 10
Raw Cauliflower	43	2.2	0 - 5
Apple Wedge	203	10.2	6 - 20

Table 2 (continued)

Food	Total	Mean	Range
Dessert			
Sliced Peaches	219	11.0	6 - 15
Pineapple Chunks	311	15.6	10 - 21
Applesauce	302	15.1	9 - 21
Jello	520	26.0	15 - 39
Pear Chips	195	9.8	4 - 15
Raisins	263	13.2	8 - 23
White Bread	304	15.2	10 - 24
Milk	430	21.5	16 - 29

carrots, beets and broccoli were least frequently selected by the group of children. Of interest, however, were the number of selections of cooked carrots in relation to the number of selections of raw carrots. The figures in Table 2 indicate that the rate of selection of raw carrots was three to one over cooked carrots. Apple wedge, classified as a finger food, was selected most frequently while raw cauliflower, beets, and broccoli appeared to be the least popular food selections made by the group of children during the twenty days in which the study was conducted.

The total grams of each food selected was recorded every day and the apparent consumption of each of the foods was determined by the investigator who weighed plate waste for each child every day and subtracted the plate waste in grams from the total grams of each food selected during the twenty days. The data in Table 3 shows the grams of food selected and consumed by the children at the noon meal during a period of twenty days. Table 4 presents by per cent the amount of each food consumed. Tables 3 and 4 are discussed interchangeably.

Tables 3 and 4 indicate that desserts seemed to be the most preferred group of food in this study if the number of grams chosen and the percentage of grams eaten are indications of preference. The data in Table 4 indicates that pineapple chunks were consumed more than any other food and jello was close in the per cent of grams consumed. Both raw and cooked apples appeared to be well liked by the children for the ratio of selection to consumption of apple wedges and applesauce was quite high, seventy eight and seventy seven per cent

Table 3

Grams of Food Selected and Consumed by Twenty Four Nursery School Children at the Noon Meal During A Period of Twenty Days

FOOD	SELECTED SERVINGS			CONSUMED GRAMS		
	Total	Mean	Range	Total	Mean	Range
Meat or Meat Substitute						
Roast Beef	1954.4	97.7	44.0 - 212.8	1376.9	68.8	31.2 - 149.5
Roast Chicken	2537.4	126.9	70.9 - 224.0	1429.7	71.5	15.6 - 176.1
Broiled Flounder	2546.1	127.3	46.2 - 224.9	2032.5	101.6	39.6 - 192.4
Beef Pattie	5327.5	266.4	151.0 - 405.0	3605.1	180.3	74.0 - 306.4
Cheese	4825.8	241.3	177.6 - 371.8	3471.8	158.6	111.6 - 233.3
Boiled Egg	5526.6	276.3	158.2 - 375.0	4075.3	203.8	113.0 - 280.2
Vegetables						
Broccoli	503.1	25.2	0 - 80.0	347.8	17.4	0 - 53.6
Green Beans	2311.5	115.6	46.2 - 236.0	1332.1	66.6	12.2 - 136.4
Green Peas	2466.8	123.3	31.4 - 239.2	1200.0	66.2	7.1 - 148.4
Buttered Carrots	787.9	39.4	11.5 - 103.2	302.3	15.1	0 - 55.9
Diced & Buttered Potato	2653.5	132.7	32.2 - 242.0	1661.1	83.1	17.8 - 235.6
Buttered Beets	563.4	28.2	0 - 78.6	145.5	7.3	0 - 36.6

Table 3 (continued)

FOOD	SELECTED SERVINGS Total	Mean	Range	CONSUMED GRAMS Total	Mean	Range
Finger Foods						
Carrot Sticks	1451.8	72.6	32.5 - 140.4	864.1	43.2	14.5 - 107.3
Celery Sticks	1142.0	57.1	10.0 - 117.0	420.4	21.0	0 - 44.8
Lettuce	537.1	26.9	0 - 64.0	247.0	12.4	0 - 35.7
Tomato Wedge	1357.6	67.9	19.3 - 143.2	876.9	43.9	14.4 - 145.1
Raw Cauliflower	195.5	9.8	0 - 29.0	134.5	6.7	0 - 24.1
Apple Wedge	2577.6	128.9	74.4 - 291.5	2015.8	100.8	30.0 - 442.6
Dessert						
Sliced Peaches	4834.8	241.7	131.0 - 343.0	3356.0	167.8	22.0 - 281.5
Pineapple Chunks	6144.1	307.2	124.8 - 514.5	5467.1	273.4	175.1 - 387.3
Applesauce	7666.1	383.3	222.3 - 575.7	5918.9	295.9	205.1 - 465.9
Jello	20,965.7	1048.3	573.0 - 2452.8	17,167.4	858.4	581.6 - 1356.1
Pear Chips	4344.8	217.2	102.4 - 342.0	3187.2	159.4	66.7 - 244.6
Raisins	3202.6	160.1	80.0 - 257.6	1955.2	970.8	27.0 - 207.7
White Bread	1753.7	87.7	53.0 - 139.2	1155.5	57.8	27.6 - 118.4
Milk	49,958.0	2497.9	1075.2 - 3630.8	29,492.1	1474.6	720.4 - 2242.9

Table 3 (continued)

FOOD	SELECTED SERVINGS			CONSUMED GRAMS		
	Total	Mean	Range	Total	Mean	Range
Finger Foods						
Carrot Sticks	1451.8	72.6	32.5 - 140.4	864.1	43.2	14.5 - 107.3
Celery Sticks	1142.0	57.1	10.0 - 117.0	420.4	21.0	0 - 44.8
Lettuce	537.1	26.9	0 - 64.0	247.0	12.4	0 - 35.7
Tomato Wedge	1357.6	67.9	19.3 - 143.2	876.9	43.9	14.4 - 145.1
Raw Cauliflower	195.5	9.8	0 - 29.0	134.5	6.7	0 - 24.1
Apple Wedge	2577.6	128.9	74.4 - 291.5	2015.8	100.8	30.0 - 442.6
Dessert						
Sliced Peaches	4834.8	241.7	131.0 - 343.0	3356.0	167.8	22.0 - 281.5
Pineapple Chunks	6144.1	307.2	124.8 - 514.5	5467.1	273.4	175.1 - 387.3
Applesauce	7666.1	383.3	222.3 - 575.7	5918.9	295.9	205.1 - 465.9
Jello	20,965.7	1048.3	573.0 - 2452.8	17,167.4	858.4	581.6 - 1356.1
Pear Chips	4344.8	217.2	102.4 - 342.0	3187.2	159.4	66.7 - 244.6
Raisins	3202.6	160.1	80.0 - 257.6	1955.2	970.8	27.0 - 207.7
White Bread	1753.7	87.7	53.0 - 139.2	1155.5	57.8	27.6 - 118.4
Milk	49,958.0	2497.9	1075.2 - 3630.8	29,492.1	1474.6	720.4 - 2242.9

Table 4

Foods Consumed by the Twenty Four Nursery School Children at the Noon Meal During a Period of Twenty Days in Per Cent of Grams Selected

Food	Per Cent
Roast Beef	70
Roast Chicken	57
Broiled Flounder	80
Beef Pattie	66
Cheese	72
Boiled Egg	74
Broccoli	69
Green Beans	58
Green Peas	49
Buttered Carrots	38
Diced & Buttered Potato	63
Buttered Beets	26
Carrot Sticks	60
Celery Sticks	37
Lettuce	46
Tomato Wedge	65
Raw Cauliflower	69
Apple Wedge	78
Sliced Peaches	69
Pineapple Chunks	89
Applesauce	77
Jello	82
Pear Chips	73
Raisins	61
Bread	66
Milk	59

respectively. The remaining desserts: sliced peaches, pear chips and raisins were frequently selected by the children and in every instance more than sixty per cent of the amount selected was consumed.

Consumption of meat ranged from 31.2 grams to 306.4 grams by the group of children. As shown in Table 3 some quantity of every food in this group was consumed each day. The frequency with which the food was selected tended to be deceiving for the percentage eaten as shown in Table 4 reveals quite a different picture. Broiled flounder was selected less frequently than the other meats as shown in Table 2 however, eighty per cent of the amount of broiled flounder selected was recorded to have been eaten. It is interesting to note that one child selected and ate flounder every one of the twenty days. Boiled eggs and cheese closely resembled flounder in per cent of selection consumed as shown in Table 4. Indications are that the children frequently selected beef patties and roast chicken but apparently consumed little more than half of the amount selected.

Vegetables appeared to be the least preferred foods provided at the noon meal, if again, the number of grams selected and the grams eaten are indications of preference. Broccoli was the least frequently selected vegetable with a daily mean number of selection of only 1.8 and the range of selection 0 - 5 for the twenty day period as indicated in Table 2. However, percentages reveal that sixty nine per cent of the broccoli selected was eaten by the children. The investigator observed during the investigation that the same children tended to select broccoli and they ate the amount they selected. Those who did not like

broccoli did not tend to include it in their selections. Of the vegetables, green peas were selected most frequently, however, less than half of the amount of peas selected were consumed. Buttered carrots and buttered beets were neither selected nor eaten in large amounts. It was interesting to observe that one child who selected buttered beets every day she was present during the investigation never ate a bite of the beets.

Although a wide range of selection and consumption was recorded within the vegetable and finger food groups of food neither was very high. Only a small amount of raw cauliflower was consumed by the children as shown in Table 3 but of the grams selected nine per cent were eaten thus tending to support the investigator's belief that by this age children have already established food preferences and in this instance only those children who liked cauliflower included it in their selections. The mean selection for tomato wedges was 4.3 servings (Table 2). Sixty-five per cent of the amount of tomatoes selected was eaten, again indicating that only a few children included tomatoes in their selections and the ones who did tended to eat them. As shown in Table 4 less than fifty per cent of the celery and lettuce selected was eaten by the children.

The children consumed relatively small amounts of bread (Table 4). Milk was not consumed in large quantities either during the twenty day period. Although every child was served a glass of milk at each meal no suggestion was made to drink it. The relationship of amount of milk served to the amount consumed was little more than half or fifty-nine per cent.

Correlation coefficients were computed to determine the relationship

between the amount of food selected and consumed by the group of children. The correlations were uniformly high. Each food group was considered separately in order to provide a more adequate description of the food.

The meat or meat substitute group of foods appeared to be well liked by the group of children. The correlation between the amount of meat or meat substitutes consumed and the other food groups selected were high as indicated in Table 5. The single negative correlation was between meat or meat substitutes consumed and the bread selected by the children indicating that the more meat and meat substitutes eaten less bread was selected.

Vegetables did not appear to be popular with the children. Nevertheless the correlations were high between the vegetable group consumed and the foods selected as indicated in Table 5. A negative correlation of -.56 was found to exist between the bread selected and the vegetables consumed indicating that as the children ate more vegetables the less bread was selected or eaten.

Finger foods appeared to follow in the same sequence. A high positive correlation was found between the amount of finger food consumed and the amounts selected of five food groups. The exception again being a negative correlation between the bread selected and vegetables consumed indicating that as the children ate more vegetables they selected less bread.

There was a negative correlation between food selected and the amount of dessert eaten indicating that as the more desserts were eaten the less the other foods were selected and eaten. This could be attributed to the fact that desserts with the exception of jello were put on the plate and the children might not have

Table 5

Relationships Between the Amount of Food Selected and Consumed by the Group of Children as Shown by Correlation Coefficients

Food Selected	Food Consumed					
	Meat and Meat Substitutes	Vegetables	Finger Foods	Dessert	Bread	Milk
Meat and Meat Substitutes	.97	.99	.98	-.52	.23	.99
Vegetables	.90	.92	.89	-.54	.33	.91
Finger Food	.97	.99	.99	-.55	.27	.99
Dessert	.58	.61	.65	00	.10	.62
Bread	-.46	-.56	-.53	.35	.41	-.52
Milk	.95	.98	.99	-.44	.25	.99

been aware of the fact that peaches, pineapple, pears, applesauce and raisins were also desserts.

There were high correlations between the amount of milk consumed and the other foods selected and consumed by the children indicating that on the days the children consumed a great deal of food they also drank large quantities of milk.

Although the investigator had expected a picture depicting the breakfast in the home to be related to the amount of food consumed at the noon meal this did not prove to be true. An analysis of the data reveals only two significant relationships between the breakfast pattern in the home and the amount of food consumed by the children at noon in the nursery school and these were negatively related. The data in Table 6 indicates that the manner in which breakfast was eaten: hurriedly, as usual, more leisurely than usual was negatively correlated with the amounts of vegetables and milk consumed by the children at the noon meal indicating that the manner in which breakfast was eaten at home was negatively related to the vegetables and milk consumed at noon in the nursery school.

Observations made by the investigator which seemed relevant to the study were: There was a wide range between the amount and kind of breakfast eaten by the twenty children. Although mothers indicated that every child ate breakfast every day, there did not appear to be much variation in the amount of breakfast eaten by each individual child during the twenty days. Those who ate a small amount of breakfast consistently did so likewise those who ate large amounts was consistent. Those children who ate small amounts of breakfast tended to eat

Table 6

Relationship Between the Breakfast Variables and the Food Consumed by the Group of Children as Shown by Correlation Coefficients

	Food Consumed					
	Meat and Meat Substitutes	Vegetables	Finger Foods	Dessert	Bread	Milk
Breakfast variables						
Day	-.28	-.18	-.19	-.23	-.31	-.24
Number Persons Eating	-.04	-.03	00	.17	-.20	-.01
Who Ate with Child	-.10	.26	.29	-.08	-.01	.25
Manner in which Eaten	-.41	-.47	-.41	.36	-.12	-.44
Departure from Customary	-.22	-.30	-.27	.33	.09	-.30
Time Breakfast Eaten	.10	.03	00	00	.14	00
Behavior Exhibited	-.36	-.33	-.37	.33	.04	-.33
What was Eaten	-.20	-.17	-.03	.22	-.22	-.17
Departure from Customary Amount Eaten	-.25	-.29	-.32	.36	-.07	-.26

little at lunch. The one exception was a girl whose breakfast consistently was generally juice, dry cereal, egg, toast, jelly, milk and a sweet roll tended to select and eat very little at lunch.

The predominant behavior exhibited by the group of children, as indicated by their mothers, was pleasant. There were a few exceptions. The investigator had expected the children who ate breakfast at an early hour to eat a larger lunch, but since a large majority of the children ate breakfast between 7:30 A.M. and 8:00 A.M. this information was not available.

Summary

In summarizing the results in this study on food selections and consumption by nursery school children there appeared to be a wide range of selection and consumption within groups of foods. Vegetables were selected less frequently than the other food groups and were eaten in smaller amounts. Desserts seemed to be the most popular food group with large amounts of each dessert selected and consumed each day. Meat and meat substitutes were slightly less preferred than desserts as a group. Finger foods were not often selected nor eaten by the group. Analysis of the data indicates little if any significant relationship between the breakfast pattern in the home and the amount of food eaten by the children and the amount of food selected and consumed at lunch. In contrast there appears to be a high correlation between the foods selected and foods consumed by the group of children at lunch during the twenty days the study was being conducted.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate the food selections and consumption by a group of nursery school children and to determine if a relationship existed between the breakfast eaten at home by the children and the amount of food consumed at the noon meal in the nursery school.

The location of the study was the Nursery School in the School of Home Economics at the University of North Carolina at Greensboro. Participating in the study were twenty-four three and four year old children who attended the laboratory nursery school and twenty-three mothers of the children who cooperated with the study. Among the children attending the nursery school two were from the same family.

For a period of twenty days the children entered the dining room in random order and selected their noon meal from twenty-five different foods that had been arranged by groups of meat and meat substitutes, vegetables, finger food and desserts on a serving table in random order. All of the foods offered had been served prior to the study so no new foods were were introduced during the investigation. Every child was served one half cup of milk which had been already poured and placed at his place when he sat down at the table to eat. As with the other foods the child could ask for as many additional servings of any food including milk as he desired. A teacher or graduate

student sat at each table with the children but did not eat with them. This was a departure from regular routine but during this investigation the teacher's primary function at the noon meal was to record the foods selected by the children. No pressure was put upon the children to eat. They were neither encouraged or discouraged to eat the food and no comment was made concerning the lack of or amount that was eaten. As much objectivity and consistency as possible was maintained.

The food was served in tablespoon portions measured and served in a standard tablespoon. A premeasured sample of each food had been weighed to the nearest tenth of a gram and the foods selected and consumed were converted to gram weights using the preweighed sample as a basis for conversion.

A record was made of the number of selections of each food and the grams selected and consumed by the twenty-four children during the twenty days. The children's food consumption was calculated by weighing plate waste and determining the percentage of consumption of each food during the twenty days of luncheon meals. The total, the mean and the range was calculated for the foods selected and the foods consumed by the children. For ease in summarizing each food was classified into one of four food groups: meat and meat substitutes, vegetables, finger food or desserts; bread and milk were treated separately and correlation coefficients were computed to determine the relationship between each food group selected by the children and the amount of each food group consumed.

The mothers filled in and returned to the investigator each day a

breakfast check sheet indicating the breakfast pattern of the children in the home. These sheets were scored on fourteen variables and the group average for each variable was obtained for the twenty days. Correlation coefficients were computed to determine if a relationship existed between the group scores on the breakfast variables and the amount of food consumed by the children at lunch.

Findings of the present study agree with studies by Dudley, Moore and Sunderlin (1960) and Dairs (1928) whose findings also revealed much variation between the foods selected and consumed.

Results of the present study indicated that desserts were the preferred foods both by number of selections and percentage consumed. A larger per cent of the pineapple was consumed than any other food. A high percentage of all the desserts were consumed by the children. The findings of the present study tend to support those of Greschunk (1963), Lamb and Ling (1946) and Mirone, Torrance and Roughton (1956) who also reported the consumption of large quantities of desserts and fruits. Meat and meat substitutes closely follow desserts as preferred foods and appeared to be consumed in sufficient quantities by the children. The findings in both the vegetable and finger food groups tend to support those of Greschunk (1963), Mirone, Torrance and Roughton (1956) and Lamb and Ling (1946) who report a universal dislike of vegetables by pre-school children. Although a wide range of selection and consumption was recorded within the group neither was very high. Apparently color and texture did not enter into the food selections. Correlation coefficients revealed high

correlations between the foods selected and consumed by the children. The consumption of bread was in most cases negatively correlated with the other foods consumed indicating that as the children ate more food they selected less bread.

The present study revealed little if any significant relationship between the breakfast eaten by the group of children at home and the amount of food consumed at the noon meal in the nursery school.

Conclusions

Although the evidence presented in this study was based on a limited number of children and for a relative short period of time the following conclusions seemed justified.

An over-all view of the foods selected and consumed by this group of twenty four nursery school children revealed a wide range of selection and consumption within the group of foods. Desserts were selected and consumed in the largest quantity with meat and meat substitutes closely following. Vegetables and finger foods were least preferred by the children who neither selected nor consumed any great quantity of either of these food groups.

The results revealed that the group studied apparently had established definite food preference, indicating the early development of choosing ability. Those children who liked certain foods selected and ate them thus yielding a high percentage consumed of some of the foods that were infrequently selected. The children were not adventurous in their selections and apparently color and

texture did not influence their selections.

On the basis of results obtained in this study there appears to be little if any relationship between the breakfast eaten in the home by this group of children and the amount of food consumed at noon in the nursery school. The sociability of a group situation probably influenced the consumption of food at noon more than did the breakfast eaten prior to coming to school. However, those children whose appetites at breakfast tended to eat small amounts at lunch and by the same token those who ate large amounts of breakfast generally ate a great deal at lunch. When given a choice indications were that the children tended to select a variety of food and to eat large amounts of their selections. Thus offering some choice of food to nursery school children on a somewhat smaller scale would seem advisable.

Some of the children whose usual attitude toward tasting food was poor generally selected larger amounts to eat and appeared to be happier at the noon meal when they were not pressured to eat or to taste food. It could be concluded that nursery school teachers and parents should place less emphasis on eating but rather encourage the children in decision making and social relationships at lunch in a warm, friendly atmosphere.

Recommendations

It is recommended that further study should be done in the area of foods selected and consumed by nursery school children. A study of the day to day relation between the food selected and consumed would be of value. A study

of this sort would make it possible to determine where the peaks of selection and consumption exists and at what point did it reach a plateau and begin to level off.

A further study might be an analysis of the data for the individual child providing depth to the study. It would be interesting to discover if on an individual basis the breakfast eaten at home by the child was related to the amount eaten at noon in the nursery school. It might also provide information concerning the child's appetite and his food preferences.

A follow up study investigating the nutrients apparently consumed by the children at the noon meal would be of value to nutritionists as well as nursery school teachers. It would be interesting to know if a relationship exists between the nutrients selected and consumed by these nursery school children and those recommended by the Nutrition Research Council.

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APPENDIX

University of North Carolina at Greensboro
School of Home Economics
February 11, 1965

Dear Mr. and Mrs. (Parents name entered here)

As a graduate student in the field of Child Development and Family Relations I am conducting a study of foods selected and consumed by nursery school children.

We are asking your assistance and cooperation in this research program. The study will be conducted for a period of twenty (20) days.

You will be asked to complete each day a form concerning your child's breakfast. Enclosed you will find the twenty (20) check lists. Will you please check one for each day beginning February 15th and continuing through March 12th.

Pin the check sheet to the child's coat so that he can bring it to the teacher each day.

We will follow our usual policy of informing you of the results of the study upon completion. However, during the period in which the study is being conducted will you please refrain from discussing the noon meal at nursery school with your child.

We appreciate your cooperation.

Sincerely,

(Mrs.) Rachael Fesmire
Teacher of Three Year Olds

(Miss) Helen Canaday
Director of Nursery School

Enclosed: 20

BREAKFAST CHECK SHEET
VARIABLE SCORES INDICATED

Dear Parent

Will you please give the following information:

Child's Name_____ Date_____

Did the child eat breakfast, yes 1 no 0 Variable #1

If yes, please complete the following:
With whom did the child eat breakfast?

Parents	1	
brothers & sisters	1	
maid	0	Variable #3
alone	0	
Total number of persons	____	Variable #2

If the child ate breakfast alone, was someone else in the room?

1	0	Variable #4
yes	no	

In what manner was this breakfast eaten? (check one)

	1	More hurried than usual	2	
Variable	0	As usual	1	Variable #5
#6	1	More Leisurely than usual	0	

What time did he eat?

Before 7:00 A.M.	0	
7:00 A.M. - 7:30 A.M.	1	
7:30 A.M. - 8:00 A.M.	2	Variable #7
8:00 A.M. - 8:30 A.M.	3	
After 8:30 A.M.	4	

What behavior was exhibited? (check one)

Variable #8	tired	0	rested	1
Variable #9	pleasant	1	upset	0
Variable #10	excited	0	calm	1
Variable #11	eager	1	dawdle	0

Variable #12
Total Score

Please indicate or specify approximate amount of each food eaten.

What did your child eat? (Check food eaten)	How much did he eat? (Amount eaten)
_____ Bacon	_____ slices
_____ Sausage	_____ pattie size
_____ Egg	_____
_____ Dry Cereal	_____ ounces
_____ Cooked Cereal	_____ ounces
_____ Toast	_____ pieces
_____ Fruit	_____ ounces
_____ Juice	_____ ounces
_____ Milk	_____ ounces
_____ Other	_____
_____	_____

Variable #13

Ratings Assigned
1 small
2 medium
3 large

This amount of breakfast was: (Check one)

Unusually Large	5
Above Average	4
Average	3
Below Average	2
Unusually Small	1
No Breakfast	0

Variable #14

Describe briefly any unusual situation which might have occurred in the home.

Form used in recording daily food selection and amount consumed.

Child's Name_____ Date_____

Foods	Number of 1st serving	Number of additional servings	Amount of first serving	Amount of Additional serving	Plate Table Waste	Plate Am't Consumed
Meat or Meat Substitute						
Roast Beef						
Roast Chicken						
Broiled Flounder						
Beef Pattie						
Cheese						
Boiled Egg						
Vegetables						
Broccoli						
Green Beans						
Green Peas						
Buttered Carrots						
Diced & Buttered Potato						
Buttered Beets						
Finger Foods						
Carrot Sticks						
Celery Sticks						
Lettuce						
Tomato Wedge						
Raw Cauliflower						
Apple Wedge						
Dessert						
Sliced Peaches						
Pineapple Chunks						
Applesauce						
Jello						
Pear Chips						
Raisins						
White Bread						
Milk						